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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
29/489,144	01/21/2000	Nan-Xing Hu	D/99136	5415

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EXAMINER

GARRETT, DAWN L

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 07/01/2003

17

Please find below and/or attached an Office communication concerning this application or proceeding.

AS 17

Office Action Summary

Application No.

09/489,144

Applicant(s)

HU ET AL.

Examiner

Dawn Garrett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 25-43 is/are pending in the application.
- 4a) Of the above claim(s) 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 25-37 and 39-43 is/are rejected.
- 7) ☒ Claim(s) 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action is in response to applicant's amendment mailed March 20, 2003, paper no. 16. The specification was amended and claims 1, 19, 31, and 35 were amended. Claims 1-19 and 25-43 are pending. Claim 38 is withdrawn as non-elected. Claims 1-19, 25-37, and 39-43 are currently pending.
2. The rejection of claims 29, 30, 36, and 37 under 35 USC 112, first paragraph, set forth in paper no. 7, paragraph 10, is withdrawn.
3. The rejections of claims 1-9, 27, 28, 31-35, and 39-41 under 35 USC 112, second paragraph, set forth in paper no. 14 (mailed November 27, 2002), paragraphs 9-11, are withdrawn.
4. It is suggested the first word of claim 10, "electroluminescent", should be changed to "An electroluminescent".
5. The rejection of claims 1-17, 25-37 and 29-41 under 35 U.S.C. 103(a) as being unpatentable over Fink et al. (US 6,352,791, the US equivalent of PCT/DE97/01269 to Robert Bosch GmbH) in view of Tang et al. (US 6,048,573) is maintained. (The examiner notes applicant's elected triazine species comprises a multivalent aromatic group with at least two fused aromatic groups as the "A" group, phenyl as the "Ar¹" group, and phenyl as the "Ar²" group as set forth in paper no. 4, mailed July 25, 2001. Applicant selected ultimate species compound II-1, which is 2,4,6-tris-(4-biphenyl)-1,3,5-triazine.) Fink et al. teaches an electroluminescent device comprising triazine

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compounds as an electron-conducting layer (see abstract). The layers of the electroluminescent device depicted Figure 1 are the following:

- 1) substrate
- 2) anode
- 3) hole injection layer
- 4) hole conducting layer
- 5) light emitting layer
- 6) electron conducting layer
- 7) electron injecting layer
- 8) cathode
- 9) encapsulation protective covering (see description of drawings)

With regard to instant Formula (I) and applicant's elected species, Fink describes triazines according to the instant formula as an electron conducting layer. R groups on the triazine skeleton include phenyl groups as well as fused aromatic rings (see col. 2 through col. 9, line 40). With regard to claims 7 and 16, it is noted that L, R', and R'' are not required. Per instant claim 10, it is noted that the buffer layer is optional. Alq₃ is taught as light emitting material (see col. 11, electroluminescent structure (B)). The Fink anode is composed of ITO and the cathode is comprised of aluminum (see col. 9, line 64 through col. 10, line 3).

Although Fink et al. describes the use of a light emitting layer such as Alq₃ in the electroluminescent device, the reference fails to disclose the light emitting layer may further comprise a fluorescent dye. Tang et al. teaches, in analogous art, doping of a

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light-emitting layer with one dopant or more to modify the color and efficiency of light emitted from the light-emitting layer (see abstract). The Tang EL device comprises a hole transporting layer, a light-emitting layer and an electron-transporting layer (see col. 5, lines 8-11). The dopants for the light-emitting layer may include coumarin dyes as well as other dyes (see col. 6, lines 42-46). Tang further teaches a desired dopant concentration range is 10^{-3} to 10 mole percent (see col. 2, lines 1-4). Because Tang teaches doping a light-emitting layer with dopant at an amount of 10^{-3} to 10 mole percent is commonly used in the art and improves efficiency of an EL device, one of ordinary skill in the art would have been motivated to have used a dye doped light-emitting layer in the Fink EL device.

Fink exemplifies an anode of 80 nm thickness, a tertiary aromatic amine layer of 80 nm (per the instant buffer layer), and a triazine layer of 30nm (see pages 9 through 10, example 1). Claim 29 recites a cathode that is about 10-800 nanometers; Fink fails to teach a thickness range for making the cathode comprised of aluminum per claims 29, 30, 36, and 37. Tang et al. teaches in analogous art a thin film organic light-emitting device comprising a cathode that is 150nm thick (see col. 9, lines 62-65). It would have been obvious to have formed the Fink cathode at a thickness of 150 nm, because Tang et al. teaches a cathode of this thickness conducts well in a thin film organic light-emitting device comprising a doped light-emitting layer.

Allowable Subject Matter

6. Claims 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the

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limitations of the base claim and any intervening claims. The closest prior art, Fink and Tang et al. (discussed above), fail to disclose or to teach a buffer layer adjacent an anode and a hole transport layer as recited in claims 18 and 19 in combination with an device comprising all other components of claim 10, upon which claims 18 and 19 depend, wherein the triazine compound is the elected species under consideration.

Response to Arguments

7. Applicant's arguments filed March 20, 2003 have been fully considered but they are not persuasive. Applicant argues the examiner has not suggested why it would be desirable to combine the two disclosures of Fink and Tang et al. Applicant states no motivation is found in either reference for combining the light emitting layer of Fink et al. with the fluorescent dye of Tang et al. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Tang is relied upon to teach a fluorescent dye is commonly added to a light-emitting layer to improve the efficiency of the light-emitting layer. One of ordinary skill in the art at the time of the invention would have been motivated to add a fluorescent dye to the light emitting layer, because it is desirable to maximize the efficiency of light emitted from a device. Tang further teaches a cathode that is 150 nm

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in thickness is a well-performing conductor in an organic light emitting device. It would have been obvious to one of ordinary skill in the art to have made selected a cathode with a thickness of 150 nm for the Fink device absent evidence otherwise, because such a cathode is well known as a good conductor for an organic electroluminescent device. Applicant further argues, with regard to Tang, the indicated concentration range is cited to point out a "difficulty" with the prior art. Applicant states "Tang et al. teaches away from Applicants' claimed concentration range because of the obstacles..." The examiner notes that non-preferred embodiments can be indicative of obviousness (see *In re Lamberti*, 192 USPQ 278 (CCPA 1976); *In re Boe*, 148 USPQ 507 (CCPA 1976); *In re Kohler*, 177 USPQ 399 (CCPA 1973)), and a reference is not limited to working examples (see *In re Fracalossi*, 215 USPQ 569 (CCPA 1982)). Applicant further states the examiner has not "pointed out in Tang et al. a single light emitting layer containing a fluorescent dye selected from the group consisting of coumarins...". The examiner submits that coumarin dye is taught by Tang et al. as a preferred dye (see col. 6, lines 42-46).

With regard to claims 7 and 16, applicant states the Examiner has failed to point out in the reference of Fink et al. where there is disclosed an L group $-C(R^1R^2)-$ per instant claim 4. The examiner submits claim 4 only requires one triazine compound selected from the group consisting of (II), (III), (IV), and (V). Fink teaches a triazine according to instant Formula (II) (see col. 2, formula (I) and following text) per instant claim 4. Instant Formula (IV) is the only formula in claim 4 requiring and R^3 and R^4 with

the variable "L" and Formula (IV) is not required to be present. The claim states formulas (II), (III), (IV), or (V) are present.

The rejections over Fink in view of Tang et al. are respectfully maintained.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (703) 305-0788. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached at (703) 308-0449. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2351.

D.G.
June 24, 2003

CYNTHIA H. KELLY
SUPERVISOR
TECHNOLOGY CENTER 1774

Cynthia H. Kelly